NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

STRUCTURE FOR WATER CONTROL

(No.)

CODE 587

DEFINITION

A structure in a water management system that conveys water, controls the direction or rate of flow, maintains a desired water surface elevation, or measures water.

PURPOSES

The practice may be applied as a management component of a water management system to control the stage, discharge, distribution, delivery, or direction of water flow.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies wherever a permanent structure is needed as an integral part of a water-control system to serve one or more of the following functions:

- To convey water from one elevation to a lower elevation within, to, or from a water conveyance system such as a ditch, channel, canal, or pipeline designed to operate under open channel conditions - Typical structures are drops, chutes, turnouts, surface water inlets, head gates, pump boxes, and stilling basins.
- To control the elevation of water in drainage or irrigation ditches - Typical structures are checks, flashboard risers, and check dams.
- To control the division or measurement of irrigation water - Typical structures are division boxes and water measurement devices.
- To keep trash, debris, or weed seeds from entering pipelines - A typical structure is a debris screen.
- To control the direction of channel flow resulting from tides and high water or backflow from flooding - Typical structures are tide and water management gates.
- To control the water table level, remove surface or subsurface water from adjoining land, flood land for frost protection, or manage water levels for wildlife or recreation - Typical structures are water level control structures, flashboard risers, pipe drop inlets, and box inlets.
- To convey water over, under, or along a ditch, canal, road, railroad, or other barriers - Typical structures are bridges, culverts, flumes, inverted siphons, and long-span pipes.
- To modify water flow to provide habitat for fish, wildlife, and other aquatic animals - Typical structures are chutes, cold-water-release structures, and flashboard risers.
- To provide silt management in ditches or canals - A typical structure is a sluice.
- To supplement a resource management system on land where organic waste or commercial fertilizer is applied.
- To create, restore, or enhance wetland hydrology.

CRITERIA

General Criteria Applicable to All Purposes

This practice shall conform to all federal, state, and local laws, rules, and regulations. Laws, rules, and regulations of particular concern include those involving water rights, land use, pollution control, property easements, wetlands, preservation of cultural resources, and endangered species.

Structures shall be part of an approved and overall engineering plan for irrigation, drainage, wildlife, recreation, channel improvement, or similar purposes.

Structural design. Standard plans shall be used where applicable. Special designs as approved by the state conservation engineer shall be prepared for those structures that exceed the size or capacity of the standard applicable plans. Structures not covered by standard plans will be designed in accordance with current engineering handbooks.

Foundation. Necessary foundation investigations shall be made. The extent of these investigations will depend on the size and importance of the structures, the geology of the area, and the initial findings of the investigation. The foundation material shall have the required supporting strength and adequate resistance to sliding and piping. It should be reasonably homogeneous so as to prevent differential or uneven settlement of the structure. Existing tile drainage systems (including abandoned systems) shall be located and considered in the design.

Capacity. Structures shall have the capacity required to carry the design flow safely, control erosion, remain stable, and keep the upstream water surface within the limits allowed. Calculations shall be made to determine the structure dimensions and capacity of structures for which no standard plan is available.

Materials. Structures may be constructed of reinforced concrete, rock, masonry, concrete blocks, metal or concrete pipe, and treated lumber. Preconstructed polyvinyl chloride (PVC) and metal structures may be used. Non-reinforced concrete may be used for structures if the height of drop does not exceed 12 inches, the design length of apron is not more than 30 inches, and the width of the notch does not exceed 24 inches.

Materials must meet the applicable standard for the kind of materials used. The selection of the material to be used should take into account the following:

- The required life of the structure
- The pH and salinity of the soil
- An annual cost comparison which recognizes all of the costs, including maintenance and replacement, for structures built of the different available materials

Location. The location will be such that the structure will give the desired protection and utility for which it was designed.

Structures shall not be installed that have an adverse effect on septic filter fields.

The water level upstream of water control structures shall not be raised on adjacent landowners without their permission.

Vegetation and fencing. If soil, climate, and site-specific conditions permit, a protective cover of vegetation shall be established on all disturbed earth surfaces. If soil or climatic conditions preclude the use of vegetation and protection is needed, non-vegetative means (such as mulches or gravel) shall be used unless temporary vegetation can be established until permanent vegetation can be established.

The structure shall be fenced, if necessary, to protect the vegetation. Vegetation shall be established in compliance with Conservation Practice Standard 342, Critical Area Planting.

CONSIDERATIONS

When planning, designing, and installing this practice, the following items should be considered:

- Effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge.
- Potential for a change in the rate of plant growth and transpiration because of changes in the volume of soil water.
- Effects on downstream flows or aquifers that would affect other water uses or users.
- Effects on the field water table to ensure that it will provide a suitable rooting depth for the anticipated crop.
- Potential use for irrigation management to conserve water.
- Effect of construction on aquatic life.
- Effects on stream system channel morphology and stability as it relates to erosion and the movement of sediment,

solutes, and sediment-attached substances carried by runoff.

- Effects on the movement of dissolved substances below the root zone and to ground water.
- Effects of field water table on salt content in the root zone.
- Short term and construction-related effects of this practice on the quality of downstream water.
- Effects of water level control on the temperatures of downstream waters and their effects on aquatic and wildlife communities.
- Effects on wetlands or water-related wildlife habitats.
- Effects on the turbidity of downstream water resources.

Design alternatives presented to the client should address economics, ecological concerns, and acceptable level of risk for design criteria as it relates to hazards to life or property.

PLANS AND SPECIFICATIONS

Plans and specifications for installing structures for water control shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

The plan shall specify the location, grades, quantities, dimensions, materials, and hydraulic and structural requirements for the individual structure. Provisions must be made for necessary maintenance. Care must be used to protect the surrounding visual resources. If watercourse fisheries are important, special precautions or design features may be needed to facilitate continuation of fish migrations.

OPERATION AND MAINTENANCE

An operation and management plan shall be provided to and reviewed with the land manager. The plan shall be site-specific and include (but not be limited to) the following: Structures will be checked and necessary maintenance, including removal of debris, shall be performed after major storms and at least semi-annually. Water level management and timing shall be adequately described wherever applicable.